National Earthquake Hazards Reduction Program

… a research and implementation partnership

Strategic Plan Discussion

Advisory Committee on Earthquake Hazards Reduction

April 30, 2019

nehrp

FEMA

NIST National Institute of Standards and Technology

NSF

USGS science for a changing world

national earthquake hazards reduction program

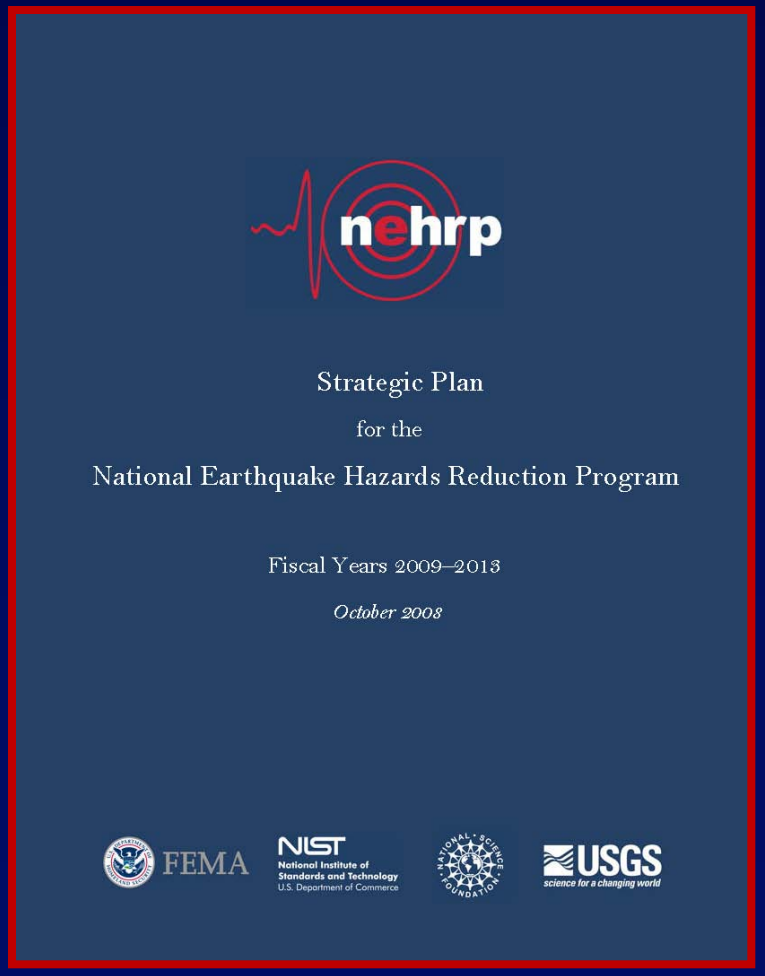
Strategic Plan

Strategic Plan Outline

- Executive Summary
- Introduction – Background (History, Prior Accomplishments)
- Vision / Mission / Strategic Planning Principles
- Goals / Objectives / Outcomes
- Strategic Priorities
- Summary
- Appendices

Public Law 101-614 enacted November 16, 1990

§(5)(b)(1)(C)—prepare, in conjunction with the other Program agencies, a written plan for the Program, which shall include specific tasks and milestones for each Program agency, and which shall be submitted to the Congress and updated at such times as may be required by significant Program events, but in no event less frequently than every 3 years;



Plan released in October 2008

Strategic Plan

National Vision Statement

A national vision for the future:

A nation that is earthquake-resilient in public safety, economic strength, and national security.

Vision gives rise to the NEHRP Mission Statement:

To develop, disseminate, and promote knowledge, tools, and practices for earthquake risk reduction – through coordinated, multi-disciplinary partnerships among the NEHRP agencies and their stakeholders – that improve the nation's earthquake resilience in public safety, economic strength and national security.

NEHRP Strategic Plan

Goal A: Improve understanding of earthquake processes and impacts

- Objective 1: Advance understanding of earthquake phenomena and generation processes
- Objective 2: Advance understanding of earthquake effects on the built environment
- Objective 3: Advance understanding of social, psychological, and economic factors linked to implementing risk reduction and mitigation strategies in the public and private sectors
- Objective 4: Improve post-earthquake information management

NEHRP Strategic Plan

Goal B: Develop cost-effective measures to reduce earthquake impacts on individuals, the built environment, and society at large.

- Objective 5: Assess earthquake hazards for research and practical application
- Objective 6: Develop advanced loss estimation and risk assessment tools
- Objective 7: Develop tools to improve the seismic performance of buildings and other structures
- Objective 8: Develop tools to improve the seismic performance of critical infrastructure

NEHRP Strategic Plan

Goal C: Improve the earthquake resilience of communities nationwide

- Objective 9: Improve the accuracy, timeliness, and content of earthquake information products
- Objective 10: Develop comprehensive earthquake scenarios and risk assessments
- Objective 11: Support development of seismic standards and building codes and advocate their adoption and enforcement
- Objective 12: Promote the implementation of earthquake-resilient measures in professional practice and in private and public policies
- Objective 13: Increase public awareness of earthquake hazards and risks
- Objective 14: Develop the nation's human resource base in earthquake safety fields

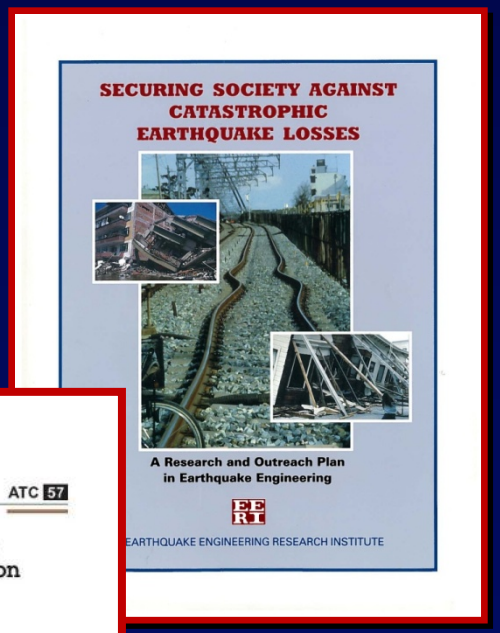
Cross-Cutting Strategic Priorities

- Fully implement Advanced National Seismic System (ANSS)
- Improve techniques for evaluating & rehabilitating existing buildings
- Further develop Performance-Based Seismic Design (PBSD)
- Increase consideration of socio-economic issues related to hazard mitigation implementation
- Develop a Post-Earthquake Information Management System (PIMS)
- Develop advanced risk mitigation technologies & practices
- Develop earthquake-resilient lifeline components and systems
- Develop & conduct earthquake scenarios for effective earthquake risk mitigation
- Facilitate improved earthquake mitigation at state & local levels

National Research Council Study: Background

2003 EERI Report

- Developed 20-yr research & outreach plan for earthquake engineering
- Provided broad discussion of national needs, listing of broad task/activity areas, & rough estimate of costs for tasks/activities



Post-2003

- Advances have occurred in the earthquake field, *e.g.*, ANSS, NSF investments (NEES, EERC), USGS and NSF investments in earth science and seismology,
- Technological advances and improvements to engineering practice
- Pace of change may not have matched that envisioned in the 2003 EERI report
- Costs have changed

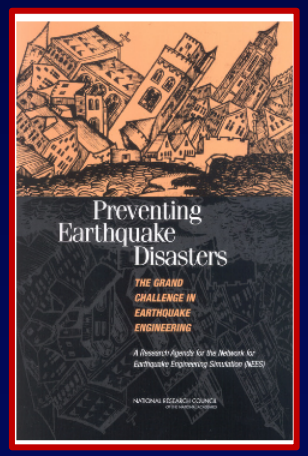
Figure courtesy of EERI

How would an update be accomplished?

A multi-faceted approach is needed:

- Use of existing reports and information from a variety of sources and professional disciplines.
- Use of direct input from stakeholders and earthquake professionals through workshops and other forums.
- Use of recent experience in developing the Immediate Occupancy report.
- Use of scenario exercises and experience from recent reconnaissance deployments to earthquakes and other hazard events.
- Application of resilience concepts and the Community Resilience Planning Guide.

Many Existing Sources to Utilize

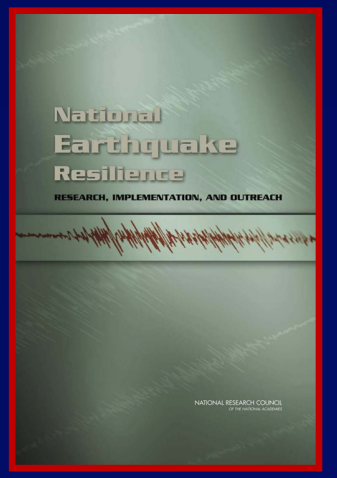


Preventing Earthquake Disasters: The Grand Challenge in Earthquake Engineering

A Research Agenda for the Network for Earthquake Engineering Simulation (NEES) (2003)

Grand Challenges in Earthquake Engineering Research

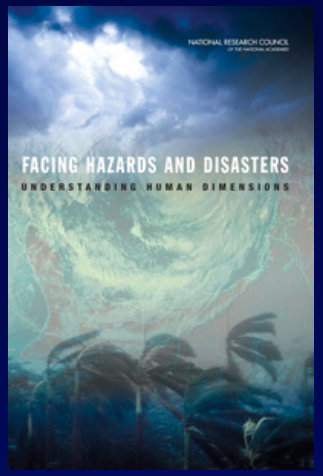
A Community Workshop Report (2011)



National Earthquake Resilience

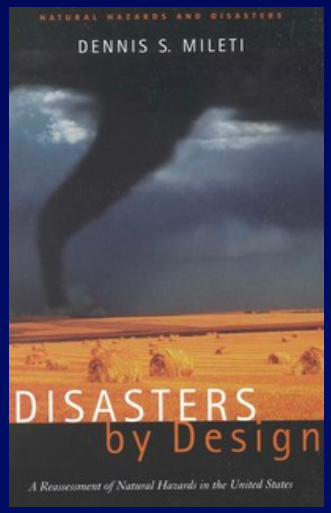
Research, Implementation, and Outreach (2011)

More Sources to Utilize Social Science



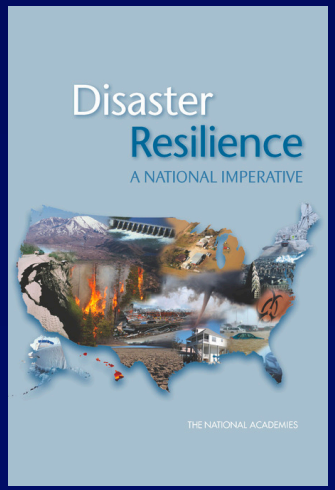
Facing Hazards and Disasters: Understanding Human Dimensions

Consensus Study Report (2006)



Disasters by Design

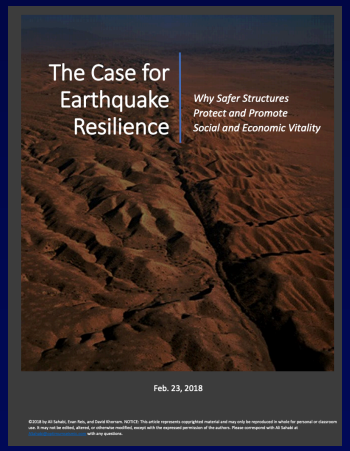
A Reassessment of Natural Hazards in the United States (1999)

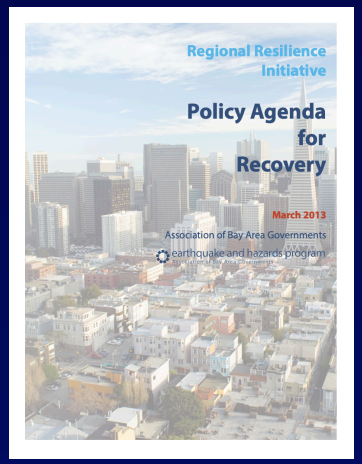


Disaster Resilience

A National Imperative (2012)

Sources to Utilize Public Policy





- There is a wealth of existing information available
- The Functional Recovery project will generate information from stakeholders, as did the IO work
- Additional information from focused workshops will be gathered
- Assessment from agency and peer review of the plan
- Input from ACEHR
- GAO assessment due in three years

Real-World Input on Strategic Planning: 2018 Cook Inlet Earthquake

- Needs Identified from Anchorage reconnaissance:
  - The ability of communities to respond to significant, above-design-level shaking for dense populations in an urban environment is important. Anchorage did not reach that shaking level but did illustrate the issue.
  - Public awareness/education shown to be an issue
  - Access to seismic data for damage assessment and recovery planning
    - More transparent (accurate and available) sensor data from instrumented buildings needed with acknowledgement of considerations from owners
  - Coordination and facilitation of building inspections
  - Improve quality and accuracy of:
    - Damage assessment methods
    - Methods for estimation of loss to non-inspected buildings
  - Mitigating non-structural damage & issues with soil and engineered fill
  - Affordability of earthquake insurance and the process and incentives for insuring property

Real-World Input on Strategic Planning: Shaken Fury Exercise

- FEMA's Shaken Fury Exercise will occur 5/29-6/7
- Magnitude 7.7 earthquake scenario near New Madrid Seismic Zone (near Memphis, TN)
- Purpose for participants across multiple sectors:
  - evaluate and improve community response
  - Identify gaps in resources
  - Implement coordinated recovery strategy prioritizing response resources
- OUTCOMES can also inform gaps in national-level NEHRP coverage and areas for improvement

Lessons from the Immediate Occupancy and NEHRP Functional Recovery Efforts

- NIST SP1224 (IO Report) Key Take-aways:
  - Focus on buildings alone will not produce IO performance (functional recovery)
  - Social, economic, and community considerations should inform desired building performance
  - Developing performance criteria for buildings requires significant stakeholder input
- The Functional Recovery study presents an opportunity to build upon these takeaways in an National EQ-focused process focused on higher performance benefits for buildings and communities.

Questions?
Comments?